SALMON AND STEELHEAD HABITAT LIMITING FACTORS

WATER RESOURCE INVENTORY AREA 17
QUILCENE-SNOW BASIN

Photo provided by Hilton Turnbull

WASHINGTON STATE
CONSERVATION COMMMISSION

FINAL REPORT

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ABBREVIATIONS AND ACRONYMS

AIMT	Annual Instantaneous Maximum Temperature
7-DADMT	7-day Average of Daily Maximum Temperature
21-DADT	21-day Average Daily Temperature
BIBI	Benthic Invertebrate Biotic Index
CCCD	Clallam County Conservation District
CREP	Conservation Reserve Enhancement Program
Ecology	Washington State Department of Ecology
HCSEG	Hood Canal Salmon Enhancement Group
JCCD	Jefferson County Conservation District
JSKT	Jamestown S'Klallam Tribe
LWD	Large Woody Debris
Mg/L	Milligrams per Liter
NOSC	North Olympic Salmon Coalition
NTU	Nephelometric Turbidity Unit
NWIFC	Northwest Indian Fisheries Commission
PGST	Port Gamble S'Klallam Tribe
PNPTC	Point No Point Treaty Council
RM	River Mile
SaSI	Salmon and Steelhead Inventory
SASSI	Salmon and Steelhead Stock Inventory
SSHEAR	Salmon Screening, Habitat Enhancement and Restoration
SSHIAP	Salmon and Steelhead Habitat Inventory Assessment Project
TAG	Technical Advisory Group
TFW	Timber, Fish and Wildlife
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WCC	Washington Conservation Commission
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WOS	Wild Olympic Salmon
WRIA	Water Resource Inventory Area

EXECUTIVE SUMMARY

Water Resource Inventory Area (WRIA) 17 is located along the northeast corner of the Olympic Peninsula in western Washington State. The WRIA extends from the Marple/Jackson watershed in southeast Jefferson County northward and westward to, and including, the Johnson Creek watershed along the west side of Sequim Bay. It is bordered to the north by the Strait of Juan de Fuca, to the east by Admiralty Inlet, northern Puget Sound and Hood Canal, and to the south and west by the Olympic Mountains and associated foothills and floodplains. The majority of the WRIA 17 watersheds are small lowland drainages with headwaters in the low foothills of the Olympic Mountains. The WRIA lies within the Olympic "rainshadow", which indicates a moderate climate with rainfall limited to 15 to 20 inches in Port Townsend and increasing to 70 to 80 inches along the foothills of eastern Olympic mountain range. The WRIA area covers approximately 626 square miles (401,000 acres) and includes portions of Jefferson and Clallam counties. Over seventy percent of the WRIA is privately owned with a population exceeding 23,000 people (Parametrix, Inc. 2000).

The majority of WRIA 17 watersheds provide spawning and rearing habitats for four species of salmon: coho, chum, steelhead, and searun cutthroat. The estuarine and nearshore habitats provide a critical migration corridor for juvenile salmon of all species. Both Hood Canal summer chum and Puget Sound chinook are federally listed as threatened under the Endangered Species Act. Summer chum are documented in many WRIA 17 streams: Big Quilcene River, Little Quilcene River, Chimacum Creek, Snow Creek, Salmon Creek and Jimmycomelately Creek. It has not been determined if native chinook still exist in Hood Canal due to the interrelations with a mixed composition of hatchery introductions. Artificial supplementation programs have contributed to inconsistent adult chinook returns to the Big Quilcene River and more recently to Tarboo Creek. Fall chum returning to Quilcene Bay and Dabob Bay watersheds are considered healthy. Coho stocks range from critical in Discovery Bay to depressed in Quilcene, Dabob and Sequim Bay watersheds. Chimacum coho are healthy according to the proposed 2002 Salmon and Steelhead Inventory (SaSI) but that designation is subject to debate due to the index location in the best spawning habitat. Not much is known about winter steelhead populations with the exception of the Discovery Bay stocks, which have been designated depressed by proposed SaSI.

The species found in WRIA 17 utilize specialized habitats at different times and at different life stages. Different species stagger their upstream migration and each species has a unique rearing strategy. All species require adequate flow and water quality, ample spawning gravels, instream structure in the form of large woody debris and/or large boulders, pools, and a functional riparian zone while inhabiting the riverine system. While coho, chinook and steelhead remain in the freshwater for an extended period of time following fry emergence, pink and chum salmon tend to move directly out into the salt water. Estuarine, high salt marsh, eelgrass and shallow water nearshore habitats are critical to all species of juvenile salmonids as they enter the marine environment. Pink and chum salmon rely heavily on eelgrass beds for feeding and hiding and shallow water

for prey avoidance. Studies also show that high salt marsh and estuarine tidal channels are critical habitats for chinook and coho as well.

Human alterations to salmonid habitat can be expected to have different consequences for different fish species and their life stages. While natural environmental conditions, such as fire, floods and mass wasting events create a disturbance/rebuilding cycle that tends to nourish the aquatic environment, human alterations to the landscape can impact the environment beyond it's natural ability to heal and sustain fish resources. Freshwater rearing is particularly critical for coho whose typical freshwater cycle extends through the summer months when many WRIA 17 streams are flow-limited. Freshwater rearing salmonids are therefore particularly vulnerable to habitat impacts such as elevated water temperatures and dewatering as a result of riparian removal and water extraction, and lack of instream structure such as pool-forming large woody debris. In the marine environment, shoreline alterations, such as bank armoring, overwater structures and intertidal fill, can interrupt important sediment input from eroding bluffs, alongshore sediment movement or drift, and continuous eelgrass beds that are critical to migrating juvenile salmon.

The Habitat Limiting Factors Analysis for WRIA 17 summarizes existing salmonid habitat data and represents the most current compilation and review of riverine and nearshore processes and human-induced impacts to salmon productivity. It does not cover salmonid productivity limited by hydroelectric dams, harvest or hatcheries. Data included or referenced in this report include watershed analysis, formal habitat inventories or studies specifically directed at evaluating fish habitat, salmon stock inventories and assessments, and other watershed data not specifically associated with fish habitat evaluation. Where data are lacking, the Technical Advisory Group (TAG) relied on its combined professional knowledge to assess the extent to which habitat conditions are affecting salmonid productivity. Where data and best professional knowledge are lacking, the habitat elements have been identified as data gaps and warrant additional specific watershed research or evaluation.

Land use activities associated with forest practices, agriculture, rural development and shoreline development have had negative impacts on salmon habitat in WRIA 17. Habitat conditions in the federally owned lands in the upper watershed, managed by the US Park Service (USPS) and the US Forest Service (USFS), are among the best in the WRIA. The USPS strives to maintain natural habitats through preservation, and even though very little land in WRIA 17 is managed by the USPS, their conservation measures protect downstream riverine function. The USFS has adopted a Riparian Reserve Program which provides for well functioning riparian habitat that ensures conifer canopy cover for temperature control, large woody debris recruitment, streambank stability to limit fine sediment input, and migratory corridors for numerous wildlife species. Their clearcuts rarely exceed 80 acres in size. This is in contrast to the large clearcuts and inadequate riparian zones on state-owned and private forest lands as evidenced in orthophoto analysis by TAG members. The riparian zone's ability to intercept fine sediments resulting from exposed soils diminishes as the riparian buffers decrease. In addition, mass wasting events and the subsequent above-normal delivery of sediments

into the Snow Creek, Nordstrom Creek and Chimacum Creek watersheds have been directly linked to improper forest road construction, maintenance and/or abandonment on state-managed and/or private forest lands. Elevated water temperatures, lack of large woody debris, and limited large woody debris recruitment due to limited riparian areas are typical of many of the watersheds in the WRIA.

Agriculture activities within the floodplains of many WRIA 17 watersheds have channelized mainstems and tributaries, drained beaver ponds for livestock grazing and peat mining and eliminated forested riparian zones. These activities have eliminated valuable juvenile overwintering and rearing habitat associated with beaver ponds, decreased broad channel meanders, eliminated floodplain connectivity to side channel habitats, reduced channel complexity and instream structure, minimized pool/riffle ratios, decreased streambed and streambank stability, and eliminated healthy riparian zones. Salmon Creek, Chimacum Creek, Upper Ludlow Creek, and Tarboo Creek watersheds have experienced degradation from agriculture activities. Further agricultural impacts to estuarine and salt marsh habitats can be observed in the Big Quilcene, Little Quilcene and Snow Creek watersheds, where extensive diking and filling into the nearshore environment have decreased estuarine function and eliminated salt marsh habitats.

Jefferson County has designated Port Townsend as its urban growth area as defined by the Washington State Growth Management Act. This has not entirely eliminated rural development throughout the county where the total population growth is among the highest in the state. Rural development tends to remove riparian vegetation for views, increase stormwater runoff with impervious surfaces and threaten water quality through the use of herbicides, pesticides and chemical fertilizers. Shoreline development contributes further to impacts to salmonid habitats. Removal of riparian vegetation for views weakens bank stability which could threaten home sites and which often results in bank protection. Shoreline armoring prevents the movement of sediments from naturally occurring backshore feeder bluffs to the nearshore. Intertidal fill eliminates shallow water habitat utilized by migrating juvenile salmon to escape prey, fragments eelgrass beds, interrupts alongshore sediment drift, and can decrease valuable salt marsh and lagoon habitats.

In order to ensure that salmonid habitats can produce sustainable and harvestable populations into the future, the Technical Advisory Group consistently placed preservation of properly functioning habitats, particularly estuaries, actively eroding feeder bluffs and riverine riparian corridors, as priority action recommendations. Preservation of critical habitats is a cost effective tool to ensure that properly functioning habitats will remain as such into perpetuity. Protection of critical habitats is the top priority for Salmon Creek and the Big Quilcene River, and is an important action recommendation for Snow Creek and Chimacum Creek. The Chumsortium, a partnership between Jefferson Land Trust, Wild Olympic Salmon, Jefferson County Conservation District, North Olympic Salmon Coalition, Hood Canal Coordinating Council, Trout Unlimited, Jefferson County and the Washington Department of Fish and Wildlife, has been actively and strategically pursuing funding for the acquisition of critical salmon habitats in east Jefferson County.

When a watershed has been severely impacted and cannot heal itself within a reasonable time frame, habitat restoration may be necessary. Once the source of the problem has been identified, rehabilitation activities can be directed to restore properly functioning condition. Such activities in the riverine environment might include removal of artificial barriers to fish passage, reestablishment of a healthy riparian zone, restoration of sinuosity and/or complexity, installation of cattle exclusion fences, abatement of mass wasting events, and/or removal of streambank armoring. Restoration activities in the nearshore might include removal of intertidal fill, restoration of lagoon and/or salt marsh connectivity, removal of shoreline armoring and/or removal of estuary constrictions that impede natural function. In some cases, property acquisition may be necessary prior to initiating restoration activities. The Technical Advisory Group identified restoration activities for the majority of the watersheds in WRIA 17. Jefferson County Conservation District, Wild Olympic Salmon, North Olympic Salmon Coalition, Hood Canal Salmon Enhancement Group, Port Gamble S'Klallam Tribe, Jefferson County and Washington Department of Fish and Wildlife have all pursued funding and participated in habitat restoration projects. Continued efforts will be necessary to increase habitat productivity to ensure sustainable salmonid populations.

Protection and restoration activities are only a part of the salmonid habitat equation. Land use regulations and their enforcement must be redirected to protect the valuable fish and wildlife resources that WRIA 17 has to offer. Preventing habitat degradation is a very cost effective tool to ensure sustainable populations of fish and wildlife into the future. The Technical Advisory Group identified assessments and studies needed to fill data gaps. In some cases, assessments might be necessary prior to beginning preservation or restoration activities.

The following report is a detailed assessment of habitat limiting factors in WRIA 17. Each watershed assessment is complete with a prioritized list of action recommendations for that watershed. The nearshore discussion is followed by a prioritized list of nearshore projects for the entire WRIA. This report provides information that can be used in the development of salmonid habitat protection and restoration strategies. It is a snapshot in time that can be supplemented with additional data from habitat assessments and habitat restoration successes as information becomes available.